What is claimed is:

1. A method of forming interconnect, comprising:

forming a dielectric layer over a substrate, the dielectric layer having trenches therein;

- forming a barrier in the trenches and on a top surface of the dielectric
- 5 layer;

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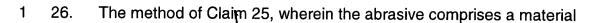
- 6 depositing metal over the barrier; and
- polishing the metal with a slurry that includes an abrasive harder than the
- 8 metal and less hard than the barrier.
- 1 2. The method of Clalm 1, wherein the dielectric layer comprises an oxide of
- 2 silicon, and the barrier is electrically conductive.
- 1 3. The method of Claim 1, wherein the dielectric layer comprises a
- 2 fluorinated oxide of silicon, and the barrier is selected from the group consisting
- 3 of tantalum, and tantalum nitride.
- 1 4. The method of Claim 1, wherein the abrasive has a Moh's hardness
- 2 between approximately 3.5 and 6.
- 1 5. The method of Claim 4, wherein the slurry has a pH between
- 2 approximately 3.5 and 7.

- 1 6. The method of Claim 4, wherein the slurry contains approximately 0.5% to
- 2 10% by weight of the abrasive.
- 1 7. The method of Claim 1, wherein the slurry contains an oxidizer comprising
- 2 H₂O₂.
- 1 8. The method of Claim 1, wherein polishing comprises chemical mechanical
- 2 polishing.
- 1 9. The method of Claim 1, wherein the dielectric layer comprises SiOF, the
- 2 barrier layer comprises tantalum, depositing comprises plating, and the abrasive
- 3 comprises one or more materials selected from the group consisting of iron
- 4 oxide, strontium titanate, apatite, dioptase, iron, brass, fluorite, hydrated iron
- 5 oxide, and azurite.
- 1)10. The method of Claim 9, wherein the slurry has a pH in the range of 3.5 to
 - 7.
- 1 11. A method of polishing a first film overlying a second film wherein the
- 2 second film is harden than the first film, comprising:
- polishing the first film with a slurry comprising an abrasive having a
- 4 hardness greater than a hardness of the first film and less than the hardness of
- 5 the second film.

- 1 12. The method of Claim 11, wherein the first film comprises copper and the
- 2 second film is comprises a material selected from the group consisting of
- 3 tantalum and tantalum nitride.
- 1 13. The method of Claim 12, wherein the abrasive comprises a material
- 2 selected from the group consisting of iron oxide, strontium titanate, apatite,
- 3 dioptase, iron, brass, fluolite, hydrated iron oxide, azurite, and combinations
- 4 thereof.
 - 14. The method of Claim 13, wherein the abrasive comprises approximately 0.5 to 10 wt.% of the slurry.
- 1 15. A slurry, comprising:
- 2 an oxidizer;
- 3 a corrosion inhibitor;
- 4 a buffer system; and
- 5 an abrasive;
- 6 wherein the slurry is characterized by providing a high Cu polish rate, a
- 7 low Cu etch rate, and a high selectivity to a Cu diffusion barrier when used for
- 8 chemical mechanical polishing.
- 1 16. The slurry of Claim 15, wherein the ou diffusion barrier comprises Ta.

- 1 17. The slurry of Claim 15, wherein the Cu diffusion barrier comprises TaN.
- 1 18. The slurry of Glaim 15, wherein the abrasive is harder than Cu and less
- 2 hard than the Cu diffusion barrier.
- 1 19. A slurry, comprising:
- an oxidizer; a corrosion inhibitor; a buffer system; and an abrasive;
- 3 wherein the abrasive is harder than a Cu diffusion barrier, and less hard than a
- 4 dielectric material.
- 1 20. The slurry of Claim 19, wherein the Cu diffusion barrier comprises a
- 2 material selected from the group consisting of Ta and TaN; and the dielectric
- 3 material comprises a material selected from SiO₂ and SiOF.
- 1 21. A slurry, comprising:
- an oxidizer; a corrosion inhibitor; a buffer system; and an abrasive;
- 3 wherein the abrasive is harder than Cu, and less hard than a Cu diffusion barrier,
- 4 and less hard than a dielectric material.
- 1 22. The slurry of Claim 21, wherein the Cu diffusion barrier comprises a
- 2 material selected from the group consisting of Ta and TaN; and the dielectric
- 3 material comprises a material selected from the group consisting of SiO₂ and
- 4 SiOF.

- 1 23. The slurry of Cla m 22, wherein the abrasive comprises hydrated iron
- 2 oxide.
- 1 24. A method of forming a damascene structure, comprising:
- 2 forming trenches in an insulating layer disposed on a substrate, the
- 3 trenches having a bottom surface and side surfaces;
- forming a barrier layer over a top surface of the insulating layer and over
- 5 the bottom and side surfaces, the barrier layer having a first hardness;
- 6 forming a layer of metal over the barrier layer; and
- 7 removing the metal layer from over the that portion of the barrier layer that
- 8 overlies the top surface of the insulating layer;
- 9 wherein removing the metal layer comprises polishing the metal with a
- slurry having an abrasive that is harder than the metal and less hard than the
- 11 barrier layer.
 - 1 25. The method of Claim 24, wherein the metal comprises copper, the barrier
 - 2 layer comprises tantalum nitride, and the dielectric layer comprises a fluorinated
 - 3 oxide of silicon; and further comprising removing the barrier layer by polishing
 - 4 with the slurry.



- 2 selected from the group consisting of from oxide, strontium titanate, apatite,
- 3 dioptase, iron, brass, fluorite, hydrafted iron oxide, and azurite.

27. A slurry for polishing copper overlying a barrier layer, comprising:

water;

- 3 hydragen peroxide;
- 4 a corrosion inhibitor;
- 5 a pH bufter; and
- 6 an abrasive;
- wherein the abrasive has a hardness between hardness of copper and a
- 8 hardness of the barrier layer.
- 1 28. The slurry of Claim 27, wherein hydrogen peroxide comprises 2 to 4 wt. %
- of the slurry; and the abrasive comprises 0.5 to 10 wt. % of the slurry.
- 1 29. The slurry of Claim 28,\wherein the corrosion inhibitor comprises 0.015 to
- 2 0.045 M benzotriazole.
- 1 30. The slurry of Claim 29, wherein the slurry has a pH in the range of
- 2 approximately 3.5 to 7.

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